

Overview on Wireless Exposure and Children's Health PAS Session 4580

Devra Davis MPH, Ph.D

How to Protect Your Family

Choose wired over wireless

- Get a computer with a phone and forward cell phones to it.
- Unplugged plug-in (no-wireless) connections for printer, mouse, internet, gaming, and routers, etc.—with all wireless functions OFF.

Safeguard sleep

- Stop use of and power off computers, tablets and phones one hour (or longer) before bedtime.
- Do not sleep with a cell phone, tablet or laptop.

Maximize distance from self and others

- Radiation decreases as you move away from the source.
- Locate devices away from laps, bras and pockets, as the can damage sperm and may be linked to breast cancer.

• Don't wear a headset or use speaker phone at maximum distance from your head and body.

Protect children

- Children are particularly vulnerable and should not use cell phones except in an emergency.

- If children are using a phone or other device for work or play, select all 3 of the following settings to turn off the radiation from cell phones and wireless devices:

• Airplane mode ON, and Wi-Fi OFF, and Bluetooth OFF.

• Don't use a mobile device while a child is on your lap or in your arms.

Power off in vehicles

- Mobile devices distract drivers, emit more intense radiation during travel, and metal surroundings create radiation hot-zones.

more & news
EHTrust.org

Doctors' Advice to Patients & Families

Wireless & Health: Simple Precautions Make Sense



This pamphlet reviews precautionary advice by Doctors and governments to reduce exposure to wireless radiation.



Brought to you by: Physicians, biomedical scientists, and neuroscientists—including Charles Teo, MD; Martha Herbert, MD, PhD; Anthony Miller, MD; Shalev Kaptein, PhD; Anne J. Sasco, MD, PhD; Michael Kundi, PhD; and Eric Meltzer-Wylde, BMBS; Dennis Lee Davis, PhD; MPH

Wireless Radiation Exposures

Wireless devices—laptops, tablets, phones, cordless, baby monitors, and wi-fi routers—all emit the same type of wireless microwave radiation as cell phones. Children, pregnant women, and men hoping to father healthy children are more vulnerable to this exposure.

The Child Brain and Skull Absorb up to Ten Times More Invisible Wireless Radiation than the Adult (Gandhi et al., 2012)



New anatomically based research shows radiation absorption.

Increased Cancer Risk

Wireless radiation has been classified as a Class 2B "Possible Human Carcinogen" by the World Health Organization's International Agency for Research on Cancer in 2011. Evidence has increased since 2011, indicating that cell phone and wireless radiation should be classified as a "probable carcinogen" because of increased brain cancer (Davis et al., 2015).

Those exposed at younger ages show up to eight times more brain cancer risk.

Radiation Absorption from Tablet into a 6-Year-Old's Brain (in the image, white & yellow areas are the highest absorption)



Federal University of Rio Grande do Sul, UFRGS Ferreira and de Sales (2015)

Wireless Exposure Damages Brains



Animals prenatally exposed to cell phone radiation develop damaged and fewer brain cells.

How Wireless Impacts Children's Health

Accumulating research shows that wireless microwave radiation affects fetal brain development, the immune system and reproductive function. Even very low doses of wireless radiation affect brain metabolism.

Yale University researchers found that when pregnant mice were exposed to radiation from a simulated operating phone, their offspring had impaired memory, increased hyperactivity and altered brains. Several research studies show wireless impairs brain development at various ages.

The Reproductive System

Numerous studies indicate that wireless exposures decrease sperm quality and quantity (including altered DNA) and damage testes and ovaries.

Testes Damaged by Wi-Fi Equipment Radiation



Long-term Wi-Fi exposure decreases testes size

(Doherty et al., 2014)

Government Protections Worldwide

Over 20 countries—including France, Belgium, Israel, and the European Union—have taken policy actions to "reduce exposure to children," addressing cell phones, laptops, cell towers and Wi-Fi in schools in order to protect public health.

detailed references available at EHTrust.org

[Click here to download the Doctors Advice on Wireless](#)

How to Protect Your Family

1. Do not hold the phone directly against your head or body

Use speakerphone, other hands-free device, or another device that meets EHT guidelines.

Beware of a weak signal

Your phone works harder and emits more radiation into you when the signal is weak or blocked.

Protect children, use pregnant abdomen, and men who want to become fathers

Children absorb twice as much radiation as adults. Sperm are especially vulnerable.

Do not sleep with your cell phone

Phones do not emit radiation when off or in airplane mode.

Corded landlines are swifter, safer, and more secure

Cordless phones also emit microwave radiation.

Do not text while moving e.g. driving, biking, blading, walking, skiing

Milliseconds can make the difference between life or death.

Brought to you by:

The Global Campaign for Safer Cell Phones provides open-source resources and educational materials for parents, teachers, students, and concerned individuals about better ways to use cell phones. Our multi-media toolkit can be downloaded at EHTrust.org.

Prepared by physicians, biomedical scientists, and neuroscientists—including Charles Teo, MD; Martha Herbert, MD, PhD; Anthony Miller, MD; Shalev Kaptein, PhD; Anne J. Sasco, MD, PhD; Michael Kundi, PhD; and Eric Meltzer-Wylde, BMBS; Dennis Lee Davis, PhD; MPH

See also: [PracticesafeTech.org](#)

Find out more about how to reduce your risk and get the latest news on our website EHTrust.org and #PracticesafeTech.

Doctors' Advice to Patients & Their Families

Cell Phones & Health: Simple Precautions Make Sense



This pamphlet reviews precautionary advice by governments to reduce your exposure to cell phone radiation.



Cell phones are two-way microwave radios that were never properly tested for safety.

Antennas for cell phones are continually searching for signals from towers to send and receive information. The body or brain absorbs about half the radiation emitted from a phone at any time.

Children absorb more radiation than adults



Courtesy Of P. Goriely and Caren American

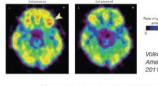
People who use cell phones for 10+ hours per day (average) for 10 years or more are at higher risk of brain cancer. Teenagers who start to use cell phones develop 4 to 5 times more brain cancer in less than a decade. Links to studies can be found at EHTrust.org.

WORLD HEALTH ORGANIZATION (2011)

On May 31, 2011, the World Health Organization/International Agency for Research on Cancer classified the electromagnetic radiation from cell phones as possibly carcinogenic to humans based on an increased risk for glioma, a malignant type of brain cancer, associated with use of mobile phones.

Can Cell Phones Cause Cancer and Disease?

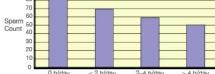
A number of recent studies indicate cell phone radiation increases cancer risk. Cell phone use in the brain. After 90 minutes of holding a cell phone on or next to the ear, the brain of a healthy adult shows significant changes in glucose metabolism—the brain's fat—at precisely those areas reached by cell phone radiation. The long-term effects of repeated exposure are unknown. Recent research suggests that cell phones, cordless phones, and other wireless devices can also disturb heart rate.



Vaidyanathan et al., Journal of the American Medical Association, 2011

Cell Phones Lower Sperm Count

Men who use cell phones 2 to 4 hours per day have 30% lower sperm count than non-users; daily use over 4 hours results in 40% lower sperm count. Studies have shown that microwave radiation can damage sperm.



Agarwal, Farfary and Stergios
World Health Organization (WHO) report on the health effects of electromagnetic fields (2011)

*Health Canada recommends that people take simple protective measures to reduce RF exposure. The department also encourages parents to reduce their children's RF exposure from cell phones since children are typically more sensitive to a variety of environmental agents.

The Facts:

Cell Phones emit microwave radiation.

Research shows:

- Damaged Sperm
- Reduced Sperm Count
- Erectile Dysfunction

Read the Fine Print: All wireless device manufacturers advise that devices should be a distance away from human bodies and brains because of the radiation.

Know how to reduce your exposure.

More at

[ehtrust.org](#)

#PracticesafeTech

ENVIRONMENTAL
HEALTH TRUST

Doctors' Recommendations

1. Protect Your Body

Airplane mode ON with WiFi OFF stops the radiation. Do not carry cell phones in your pockets or bra. No laptops or tablets on your lap.

2. Practice Safer-Phone

Prefer a corded landline phone. Hold cell phones away from the head and body by using speakerphone.

3. Protect Your Fertility & Your Pregnancy

No wireless devices near reproductive organs or near a pregnant woman's abdomen.

4. Practice Safe Tech

Turn off WiFi and use cords to connect to routers, phones, computers and other devices.



[Save the Boys!](#) [Save the Girls!](#)

[Click here to download the Doctors Advice for Cell Phones](#)



[Click here to download the SAVE THE GIRLS](#) [Click here to download the SAVE THE BOYS](#)

CANCER CITATIONS

1.F. Barnes and B. Greenenbaum, ["Some Effects of Weak Magnetic Fields on Biological Systems: RF fields can change radical concentrations and cancer cell growth rates."](#) in *IEEE Power Electronics Magazine*, vol. 3, no. 1, pp. 60-68, March 2016.

2.Coureau et al., (2014). [Mobile phone use and brain tumours in the CERENAT case-control study](#). *Occup Environ Med*. 71(7), 514-22.

3.Lerchl et al., (2015) [Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans](#). *Biochemical and Biophysical Research Communications*, Available online 6 March 2015.

4.Morgan LL, Miller AB, Sasco A, Davis DL, [Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen \(2A\) \(review\)](#). *Int J Oncol*. 2015 May;46(5):1865-71. Epub 2015 Feb 25.

5.Carlberg M, Hardell L. [Decreased Survival of Glioma Patients with Astrocytoma Grade IV \(Glioblastoma Multiforme\) Associated with Long-Term Use of Mobile and Cordless Phones](#). *International Journal of Environmental Research and Public Health*. 2014;

6.L. Hardell, M. Carlberg, [Cell and cordless phone risk for glioma - Analysis of pooled case-control studies in Sweden, 1997-2003 and 2007-2009](#), *Pathophysiology* (2015). Available online 29 October 2014.

7. Lerchl et al., [Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans](#), *Biochemical and Biophysical*

Research Communications, Available online 6 March 2015.

8. Soffritti et al., [Life-span exposure to sinusoidal-50 Hz magnetic field and acute low-dose γ radiation induce carcinogenic effects in Sprague-Dawley rats](#), International Journal of Radiation Biology. Vol. 92, Iss. 4, 2016

9. Yakymenko et al.,(2015) [Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation](#).

Electromagnetic Biology and Medicine. July 7,

REPRODUCTION

1.Adams J, Galloway T , Mondal D, Esteves S, Mathews F. (2014). [Effect of mobile telephones on sperm quality: A systematic review and meta-analysis](#). *Environment International*. 80, 106-112.

2. Atasoy HI, Gunal MY, Atasoy P, Elgun S, Bugdayci G. (2013). [Immunohistopathologic demonstration of deleterious effects on growing rat testes of radiofrequency waves emitted from conventional Wi-Fi devices](#). *Journal of Pediatric Urology*. 9(2), 223-9.

3. Avendaño C, Mata A, Sanchez Sarmiento CA, Doncel GF.(2012). [Use of laptop computers connected to internet through Wi-Fi decreases human sperm motility and increases sperm DNA fragmentation](#). *Fertility Sterility*. 97(1), 39-45.

3. Yüksel M, Naziroğlu M, Öz kaya MO. [Long-term exposure to electromagnetic radiation from mobile phones and Wi-Fi devices decreases plasma prolactin, progesterone, and estrogen levels but increases uterine oxidative stress in pregnant rats and their offspring](#). *Endocrine*. 2015 Nov 14. [Epub ahead of print]

4. Odacı E, Hancı H, Yuluğ E, Türedi S, Aliyazıcıoğlu Y, Kaya H, Çolakoğlu S. [Effects of prenatal exposure to a 900 MHz electromagnetic field on 60-day-old rat testis and epididymal sperm quality](#). *Biotech Histochem*. 2015 Oct 15:1-11.

5. Ziberlitz A, Wiener-Magnazi Z, Sheinfeld Y, et al. [Habits of cell phone usage and sperm quality – does it warrant attention?](#) Reproductive BioMedicine. Published online September 2015

Gul A, Celebi H, Uğraş S.(2009). [The effects of microwave emitted by cellular phones on ovarian follicles in rats](#). *Arch Gynecol Obstet*. 280(5), 729-33.

6. Bakacak M, Bostancı MS, Attar R, Yıldırım ÖK, Yıldırım G, Bakacak Z, Sayar H, Han A. [The effects of electromagnetic fields on the number of ovarian primordial follicles: An experimental study](#). *Kaohsiung J Med Sci*. 2015 Jun;31(6):287-92. doi:

10.1016/j.kjms.2015.03.004. Epub 2015 Apr 30.

RADIO FREQUENCY ABSORPTION

1.Morris, R.D.; Morgan, L.L.; Davis, D.L., ["Children Absorb Higher Doses of Radio Frequency Electromagnetic Radiation From Mobile Phones Than Adults."](#) in Access, IEEE , vol.3, no., pp.2379-2387, 2015 doi: 10.1109/ACCESS.2015.2478701

2.Fernandez-Rodriguez, C.E.; De Salles, A.A.A.; Davis, D.L., ["Dosimetric Simulations of Brain Absorption of Mobile Phone Radiation-The Relationship Between psSAR and Age."](#) in Access, IEEE , vol.3, no., pp.2425-2430, 2015 doi:

10.1109/ACCESS.2015.2502900

3.Gandhi OP, Morgan LL, De Salles AA, Han YY, Herberman RB, Davis DL. (2012). [Exposure limits: the underestimation of absorbed cell phone radiation, especially in children](#). *Electromagn Biol Med*. 31(1), 3451.

4.Juliana Borges Ferreira and Álvaro Augusto Almeida, [Specific Absorption Rate \(SAR\) in the head of Tablet user's](#) Proceedings of the 7th Latin American Workshop On Communications - 2015

5.Redmayne M, Johansson O. [Radiofrequency exposure in young and old: different sensitivities in light of age-relevant natural differences](#). *Rev Environ Health*. 2015 Dec 1;30(4):323-35. doi: 10.1515/reveh-2015-0030.

6.Gandhi, Om. [Yes the Children are more exposed to radio-frequency energy from mobile telephones than adults](#). IEEE Spectrum. PP(99):1. Jun 23, 2015.

7. Panagopoulos, D. J., Johansson, O., & Carlo, G. L. (2015). [Real versus Simulated Mobile Phone Exposures in Experimental Studies](#). *BioMed Research International*, 2015, 607053. <http://doi.org/10.1155/2015/607053>

POLICY Download EHT's briefing that details the worldwide precautionary policy on wireless.

<http://ehtrust.org/wp-content/uploads/2016/04/4-28-2016-InternationalPolicyPrecautionaryActionsOnWirelessRadiationApril2016.pdf>

Redmayne M. [International policy and advisory response regarding children's exposure to radio frequency electromagnetic fields \(RF-EMF\)](#). *Electromagn Biol Med*. 2015 Jun 19:1-9.

STRUCTURAL

1.Zhang (2015), [Exposure to 900 MHz electromagnetic fields activates the mkp-1/ERK pathway and causes blood-brain barrier damage and cognitive impairment in rats](#). *Brain Res*. 2015 Mar 19;1601:92-101. doi: 10.1016/j.brainres.2015.01.019. Epub 2015 Jan 15.

2.Dasdag et al., [Effects Of 2.4 Ghz Radiofrequency Radiation Emitted From Wi-Fi Equipment On microRna Expression In Brain Tissue](#). *Int J Radiat Biol*. 2015 Mar 16:1-26.

3.Bas et al., (2009). [900 MHz electromagnetic field exposure affects qualitative and quantitative features of hippocampal pyramidal cells in adult rat](#). *Brain Research*. 1265, 178–185.

4.Jing J, Yuhua Z, Xiao-qian Y, Rongping J, Dong-mei G, Xi C. (2012). [The influence of microwave radiation from cellular phone on fetal rat brain](#). *Electromagn Biol Med* 31(1), 57-66.

5.Naziroğlu M. and Gumral. (2009). [Modulator effects of L-carnitine and selenium on wireless devices \(2.45 GHz\)-induced oxidative stress and electroencephalography records in brain of rat](#). *Int J Radiat Biol*. 85(8), 680-689..

6.Nittby H, Brun A, Eberhardt J, Malmgren L, Persson BR, Salford LG. (2010). [Effects of microwave radiation upon the mammalian blood-brain barrier](#). *European Journal of Oncology*. 5, 333-355.

7.Sirav B, Seyhan N. (2011). [Effects of radiofrequency radiation exposure on blood-brain barrier permeability in male and female rats](#). *Electromagnetic Biology and Medicine*. 30(4), 253-60.

8.Narayanan SN, Kumar RS, Karun KM, Nayak SB, Bhat PG., (2015) [Possible cause for altered spatial cognition of prepubescent rats exposed to chronic radiofrequency electromagnetic radiation](#). *Metab Brain Dis*. 2015 Oct;30(5):1193-206.

9.Margaritis L.H. et al., 2014. [Drosophila oogenesis as a bio-marker responding to EMF sources](#). *Electromagn Biol Med*. 33(3): 165-189. <http://www.ncbi.nlm.nih.gov/pubmed/23915130>

10. Papageorgiou C.C. et al.,(2011) [Effects of Wi-Fi signals on the p300 component of event-related potentials during an auditory hayling task](#) *Journal of Integrative Neuroscience* 10(2):189–202

11.Leszczynski et al., (2002) [Non-thermal activation of the hsp27/p38MAPK stress pathway by mobile phone radiation in human endothelial cells: molecular mechanism for cancer- and blood-brain barrier-related effects](#). *Differentiation*.May;70(2-3):120-9